

RAP Meeting
February 2, 2005
Marine Science Institute
University of California, Santa Barbara

Participants

Chris Mobley, CINMS Manager
Dan Brumbaugh, AMNH at MPA Science Institute
Hunter Lenihan, UCSB Marine Community Ecology
Churchill Grimes, SWFSC Santa Cruz
Kevin Lafferty, USGS UCSB
Nicki Adams, Cal Poly SLO
Donna Schroeder, MSI, Board of Directors Sanctuary Foundation
Jackie Buhl, CINMS
Satie Airame, PISCO
Natalie Senyk, CINMS
Dave Seigel, UCSB Geography, ICESS
Jessie Allstadt, Santa Barbara Channel Keeper
Jack Engle, MSI, Marine Network
Jenn Caselle, PISCO
Bob Warner, PISCO
Mike Murray, CINMS SAC Coordinator
Mary Bergen, Research Coordinator at DFG

Audience

Peter Skyler, Catalina I, Santa Cruz I
Shari Smith, Naturalist Corps

Background

Collaborative Research Monitoring Program

\$30 k in bank

\$80 k will be added

Social Science Coordinator, Chris LaFranchi, was hired by the CINMS to function as a local and regional coordinator. He will gather information on the local and regional status and trends of socioeconomic data.

ACTION: Invite Chris LaFranchi to the next RAP meeting.

NOAA Science Integration Project: The MPA Center is working with SWFSC to integrate MPAs into traditional fisheries science and management.

Review Types of Monitoring in Table 1 of CDFG Monitoring Plan

SHALLOW SUBTIDAL ACTIVITIES (Highest DFG Priority)

SCUBA Surveys, Figure 1 shows shallow subtidal monitoring sites

SCUBA surveys are conducted on rocky reef habitats using a specific set of protocols.

Partners who conduct SCUBA surveys

National Park Service (NPS)

PISCO

Crane (Love, PISCO, Pondella)

CRANE funding was federal money given to the state for mitigation of offshore oil. This was one-time funding. CRANE consists of 75-80 sites in central and southern California, with all sites following same protocol.

NPS protocols sufficiently different from CRANE, making an integrated analysis difficult. NPS could adjust protocol to be more consistent with CRANE.

NPS may be interested in contracting fish surveys to PISCO/CRANE.

Recommend that NPS do at least one cool water site in their new experiment.

Sites that will be surveyed in 2005

Anacapa

Scorpion

Santa Barbara

Likely sites to add in 2005

Gull Island

San Miguel

Potential gaps in 2005

Santa Rosa

San Miguel

Southeast side of Santa Cruz

Soft substrate habitats

Two main gaps are SRI and SMI. At least one pair of core sites is needed at each of those islands. Monitoring should occur in cooler water region, not just warm water region. Several replicates of sites at several islands are needed to establish the baseline during the first few years.

SRI is ringed with shallow rocky reef. The MPAs at SRI may have impacts on the distribution of urchin fishing. The southern area (South Point) is possible to monitor more easily than other areas around SRI. It costs more money to work at SRI than the eastern islands, requiring more personnel time, more vessel time.

Considerations

Continuity of monitoring

Data analysis

Data management

Temporal range of expected changes

Monitoring of both biogeographic regions

Often monitoring programs break down over time because of lack of funding.

Need to set up a hierarchy of core sites and additional sites.

Need core sites to answer basic questions

Add other layers on as funding becomes available (not part of the core)

Possible solutions:

Depending on the temporal range of expected changes, it might not be necessary to survey each site every year. Develop a set of core sites to be done every year and then add additional sites as funding becomes available for short-term projects.

Timeframe

Should sites be monitored every year, every other year or longer?

The first major report to Fish and Game Commission is due at the end of year 5. A minor report is given each year.

To pick up trends, SCUBA surveys should focus on species that have a faster response times.

Criteria for selecting core sites:

- Cover all islands
- Subset of sites in 2004
- Preference to areas that have been monitored for a long time
- Sites to investigate hypotheses about inside and outside of MPAs

Funding

To maintain the array of core sites is a high priority. Funding for monitoring comes from existing monitoring programs:

- CINMS
- PISCO
- DFG

When considering a funding/support request to CINMS, need to work in coordination with NMSP fiscal year budget cycle.

Surveys are conducted annually during the summer and fall

Each site is well sampled

What is counted in SCUBA surveys?

- Fish size and density
- Swath count (macroinvertebrates, benthic cover)

Ecological changes that may be detected

Changes in size structure may be more apparent than spillover, for example.

Increase in size, quicker response

Increase in abundance, slower response

CDFG Monitoring Plan: Table 3, Page 12: Target species list for monitoring

Criteria for species list

Exploited species

Unexploited species

Easy to count

Species with detectable, measurable responses to MPAs

List was developed, in part, during the 2003 monitoring workshop

Lafferty paper: Determined that 7 species can indicate kelp forest and urchin barrens (2 of these are included on the list of target species for monitoring: kelp and urchins).

Seven indicators of kelp forests and urchin barrens

- Kelp
- Urchins
- Cover of bare substrate
- Cover of *Coryanactis* and *Astrangia*
- Bryozoan *Dioprepia*
- Crustose coralline algae

Kevin Lafferty's Recommendation:

Do as many sites as possible, but survey only target species that give as much information as possible.

Jenn Caselle's comment:

List of 20 species in Table 3 is appropriate because the question relates to target species and responses to MPAs. Surveys focus on population density and size changes for the MPA experiment.

Is it important to assess whether or not MPAs lead to state changes in communities?

If so, monitoring species that indicate those state changes should be included.

Recommendation: To insure that monitoring can capture changes in state, maintain the monitoring list and add the species that indicate state changes. If constraints prevent a full survey, then only key species should be monitored.

Table 3 is misleading due to growth rate and fecundity columns.

Species not effectively monitored with SCUBA

Lobster (state managed fishery)

Abalone

Cabezon (could be monitored with other techniques)

For abalone, need to keep them in the survey because previously they were much more abundant.

Stock assessment of urchin fishery is a great idea, but it is not part of monitoring.

Doyle Hannon is conducting fish tagging survey (hook and line) in central and southern California. Using recreational fishermen, primarily targets rockfish in shallow waters, massive program geared toward returns of tagged fish.

Pfleger Institute: SBI, ANI are ringed with double rings of receivers. Newly tagged fish can be added to the array. Species already studied include black seabass, sheephead and kelp bass (James Lindholm), ocean whitefish (Cal State Long Beach grad student).

Is there a need for the trap-fixed gear project? Should this be a target for the collaborative research funding from CINMS?

Engle recommends that the fixed gear project focus in one area, Anacapa or east end of Santa Cruz. Need intensity and array at one or more sites to figure out rate of spillover. Need adequate coverage, intensive study in a few places.

TRAP-FIXED GEAR

Trap-fixed gear surveys equally important to SCUBA surveys

- Fishermen can participate
- Can figure out gradients of CPUE (outside of MPAs)
- Catch species that are not adequately monitored.
- Visual survey, vs. trapping, vs. hooks to calibrate the trap surveys
- Can get specimens in hand to weigh or tag

Bren School Project:

Fixed gear monitoring of lobster at

- Anacapa
- Scorpion
- Gull Island
- Inside, near, and far from MPAs

Collaborative project

Need more feedback from fishermen themselves and NMFS Science Center should be involved. Need to get “fisheries scientists” involved in the project.

Church suggested possible involvement of NMFS through their scientific interest in MPAs.

Schroeder suggested trapping, not just warm water area, but also in cold water areas.

Trap fixed gear data could be coordinated with commercial take. Need to do both because there might not be sufficient fishery-dependent data.

No logbooks exist for live-fish fishery. Need a project to create a logbook for live-fish fishery.

Could collaborate with the recreational fishing industry to recapture tags.

Recommendation: Fixed gear trapping program is a gap in the monitoring program with high priority, and is a good candidate for collaborative research.

What are priorities for biological monitoring for collaborative research program?

Recommendation: Species that are not adequately monitored by other means are of high priority for monitoring.

What is the level of adult spillover or movement? Is this a monitoring question or an experiment? We need to know ARE THESE FISH SPILLING OVER INTO OPEN AREAS? The answer to this question advances marine reserve science and design. How do we build a monitoring program that can detect spillover or movement? [Dave Seigel: This is just another parameter that describes the demography of the population.] The supporting documents claim that establishment of reserves will result in net increase in fish in the fishery.

Several possible answer: model, or trap data, CPUE, along a gradient from MPAs to open areas. Need to figure out transport of individuals from point A to point B. Empirical evidence can be measured through tagging or telemetry. Do we do this every year, or do we figure out for each species the home range size and then use the data to model possible spillover? Mark and recapture programs could determine where animals are going and if the flux increased over time. Should this be a priority for monitoring?

Recommendation: Within trap-fixed gear program should be implemented. Some attention should be paid to differences in density and mark-recapture. This would provide valuable information about movement. Trapping program would provide the opportunities for tagging focal species, but this is not a long-term monitoring program. This is research that could be done over several years (dissertation project) to determine characteristics of focal species.

Political pressure is a function, in part, of the success of fishing industry.

Perspective of the fishermen: Establishment of reserves forces fishermen into open areas, leading to congestion.

Other ways of figuring out effects of MPAs on fisheries: Track landings and distribution of boats.

Adult spillover –can be detected through telemetry and trap and fixed gear surveys

Benefits of fixed gear surveys over SCUBA surveys: Can tag individuals and recapture them

To determine changes in movement over time; need a fixed gear or trap program. Could be done every few years, could be 1-2 year project every 5 years or so.

Lindholm: Need for additional fish and invertebrate movement data
Telemetry is the primary method of gathering movement data (process study)
Trap (mark and recapture is part of monitoring)

Over time, do we see congestion of fishermen at the boundaries of MPAs? Fishing the line? Over time we are likely to see the socioeconomic

Socioeconomic monitoring includes the Sanctuary Aerial Monitoring and Spatial Analysis Program (SAMSAP) aerial surveys, which can also assist in examining spillover

Coordination of Biological Monitoring

Priority of the Sanctuary: Data management and synthesis
Need a good system to archive the data and make it available without violating individual rights.

Perhaps we need a coordinator of monitoring data
(Also recommended at the Starr monitoring workshop)

Priorities:

Coordination
Accessibility of data
Coordinated person or central location of data

Recommendation: A coordinator is needed to:

- Keep track of existing monitoring programs
- Coordinate data streams
- Analyze data
- Archive data
- Report annually to RAP on preliminary results

The Sanctuary has offered to provide support for a person to coordinate the monitoring effort.

Models for coordination:

- MARINE (Multi-Agency Rocky Intertidal Network monitoring program). Jack Engle is the coordinator. MARINE has developed an effective approach to coordinate among participating scientists who share a common database. A

- public website is available for outreach and a private website is available for internal communications among group members.
- OOS, CenCOOS, etc: The first task of the ocean observing system is data management. The OOS tend to attract more physical oceanographers, but biological data also is housed within OOS.
 - National Marine Sanctuary Program Integrated Monitoring Network: Long-term monitoring strategy is being planned for the National Marine Sanctuary Program.

Options for outreach to scientific community

- Channel Islands Symposium

The Monterey Bay National Marine Sanctuary sponsors an annual meeting reviewing research efforts

Aerial Monitoring of Kelp Canopy

Statewide aerial kelp (DFG staff is dwindling but project will be maintained)

1999

2002

2003

2004

2005 (expected)

CI-CORE (Center for Integrative Coastal Observation, Research and Education, Moss Landing; Dick Zimmerman) performs multi-spectral aerial surveys of kelp along the central coast and may expand to the southern coast as well. Surveys were conducted as far south and Santa Barbara in 2004.

Newly Settled Fish Surveys

Bbi-weekly visual surveys, as well as with PISCO Standardized Monitoring Units for Recruitment of Fishes (SMURFS), were conducted in 2004.

SMURFS can be used to address the question of larval spillover, which is an exceedingly difficult question it may not be possible to answer. SMURF program can figure out year class size and monitor fluctuations through the entire island chain. The current program will not answer the question about increased recruitment outside of MPAs.

Monitoring of recruitment is important.

SMURFs monitor recruitment and are most useful for establishing a baseline and follow age classes through marine reserves. To detect the effects of MPAs on patterns of recruitment, a more extensive array must be established, and even then, it would be difficult.

Urchin recruitment was useful.

Lafferty detected no differences in recruitment inside and outside MPAs, but large differences in adult population sizes. Recruitment data will help determine whether or not fluctuations are due to MPA effects or fishing effects.

ROV Surveys

DFG conducted three ROV surveys in deeper water (20-80 m).

Nov 2003 and May 2004 (developmental surveys)

Sept 2004 (full surveys) with replication at Gull Island, Santa Cruz, Carrington Point, and Santa Rosa. (1 site at Anacapa Island, 2 at Santa Cruz Island and 2 sites at Santa Rosa Island)

Can easily do: 2 reserves, inside and outside paired surveys

Target: 5 paired surveys inside and outside MPAs

Need 2 weeks of boat time

NMSP has contributed boat time

Deep submersible surveys

Associated with oil platform work by Milton Love

Deep submersible surveys depend on weather. If weather is good, then the oil platform surveys and additional surveys can be done. There is some before data from 1995-1999. Mary Yaklovich has conducted surveys of Santa Barbara Island in 2002, which is part of the Cowcod Conservation Area. In 2002 and 2004, the Sanctuary provided 4 days on boat to do monitoring.

On Footprint, there has been consistent monitoring inside the proposed MPA. However, no other areas are available for comparison with the Footprint because of its unique, heterogeneous habitats.

Other surveys occurred at Gull Island and north shore of San Miguel and Anacapa Islands. Future funding to do oil platform surveys will continue but the additional surveys done in MPAs depend on good weather. From observations, there appears to be movement of large fish into protected areas (oil platforms).

Beginning of deep submersible monitoring program

- Gull Island
- Anacapa
- Santa Barbara Island (from monitoring of Cowcod Closure)

Some monitoring of SBI should be done to respond to criticisms that the effects of the Cowcod closure were not considered in the MPA design.

John Bulter (ROV work on cowcod) probably conducted research at Cortez and Tanner Banks in waters deeper than the reserves.

Results of submersible surveys

Impacts of MPAs can be detected through submersible surveys.

Current regulations

Bottom fishing is prohibited below 60 fathoms (through the rockfish conservation area). Therefore it will be difficult to detect the differences between MPAs and non-MPA areas because all areas are currently closed. It may be possible to detect differences in large invertebrates that were affected by roller gear and prawn trap fishing. In addition, black coral has been observed only in high relief spots that were not trawled. Some of the responses are very rapid. For example, large sponges grew in less than 10 years on some of the deep Exxon platforms.

Problems:

- Scheme of sampling sites has not occurred every year. There is no dependable source of funding.
- No processing of data. In 2004, there was some extra money to do analysis, which is being done now. Additional funding must be acquired for processing of data.
- No coordination of submersible and ROV work. Dirk tried to coordinate, but funding was limited.

Recommendation

Better coordination of efforts

Focus on minimum, systematic sites (at least one paired site) with opportunistic sites added if funding available

Are other techniques available to study deep water habitats/species?

Cameras, traps?

More thought needs to be focused on developing the deeper water monitoring

Opportunity exists for a major calibration study to integrate different techniques. Could be an avenue to get more information from limited data.

Federal Sanctuary Monitoring Program

Last spring, 2004, Sanctuary program initiated discussions about the federal monitoring program. The Sanctuary identified key questions without prioritizing them. There will be another meeting in March or April 2005 to identify the priorities for the Sanctuary program. The federal monitoring program will build on the existing State monitoring program. The federal monitoring program will be modeled after MBNMS SiMON. This program identified gaps in monitoring and priorities for funding. However, SiMON has had substantial external funding and a full time coordinator. Consider the funding needed to develop a project like SiMON.

Funding for Deep Water Monitoring

The funding sources for ROV and SCUBA surveys are different. Some data are needed to build a deepwater monitoring program. Possible sources of funding include:

- DFG has \$140 k (from MARE-Marine Applied Research and Engineering)
- Sanctuary provided ship time and funding for submersible surveys
- Approach Exxon for funding for deep subtidal monitoring. Donna Schroeder is skeptical that Exxon would be interested because of their past responses.
- Jack Engle mentioned that a private individual in southern California is going to have an ROV for personal use.

Recommendation: Need more coordination to find out what is going on for deep subtidal monitoring.

Intertidal Monitoring

MARINe—a model for how to organize subtidal monitoring programs

Long-term monitoring program set up in 1980s (ongoing for 20 years)

Key species, fixed plot for dominant species

Including black abalone, owl limpets, mussels

If MPAs are established on mainland, then take of intertidal organisms (including limpets and mussels) will be an important consideration.

Long-term funding has been provided by NPS and MMS. In the future, the funding from MMS may be lost because they may not be able to do more oil exploration in California. The intertidal monitoring at the Channel Islands is part of larger network of 70 sites throughout California. All data from the partners are entered into a database developed by SCWRP. The results are organized data, easy to access, basic trends are available on public website at marine.gov.

Recommendation: More intertidal surveys inside and outside MPAs should be added in the future, if additional sites can be added.

Other topics to consider

Monitoring shallow soft bottom habitats

Soft bottom habitats at the islands have the full range of exposure

More exposed: have less obvious living communities

Less exposed: very important for living communities

We know where the seagrass beds are located and their approximate sizes.

We need to figure out if these areas are important for the monitoring program.

We don't know if eelgrass is essential for certain species.

Monitoring would be relatively easy in many soft bottom habitats.

However, scientists might not be able to gather enough data to have statistical significance due to small number of eelgrass beds.

Skunk Point

- Major eelgrass site
- Major crab trapping area
- No monitoring in Skunk Point

Scorpion

- Anchoring activities may impact smaller eelgrass beds
- Could be monitored inside and outside of the MPA

Smuggler's Cove

Prisoner's Cove

- Both have eelgrass beds

Sites with Pismo clams and geoduck clams are vulnerable to harvesting so these should not be highlighted as target species.

Recommend: Shallow subtidal monitoring of soft sediment communities should become part of the monitoring program and there may be someone (Jessie Allstadt) to do the research and a small source of funding. Note that seagrass beds may be very important components to this ecosystem where we already have data. Target: develop protocol for monitoring seagrass beds and maintain program as a limited focus for monitoring. Determine the importance of these habitats in system dynamics.

An evaluation should be done to figure out if there might be effects of MPAs on soft bottom habitats. Are the resources captured? Overlay the eelgrass beds with the reserves.

Hypothesis: East end of SRI was a major crab fishery, which has stopped now. No other information is available. Anecdotal data suggest that there were lots of crabs there.

There could be indirect effects of MPAs on soft bottom communities, e.g. predation of cabezon on gobies, which consume inverts in soft sediment. Possible trophic cascade.

Fish nursery areas would not be directly impacted by MPAs because small fishes are not targeted.

SCWRP does soft bottom infaunal cores.

Importance of monitoring where fishing occurs through the Sanctuary.

It is important to determine where fishing occurs in Sanctuary because this variable is needed as a covariate analyses of ecological data. We need to know what type of fishing occurs and where. The Sanctuary can determine where fishing activity occurs through the SAMSAP program.

Recommend letter from SAC to support use of plane for SAMSAP. Plane is important to figure out intensity of use in areas that we are monitoring. Need to know the fishing distribution to interpret the results from biological monitoring.

Monitoring the Acoustic Environment

Study of marine acoustics from EDC (Polefka)

Recommendations from SAC:

Page 38 of report

- How can we monitor noise in the marine environment?
- Better understand hearing capabilities of animals
- Consider noise impacts on Sanctuary ecology

Sanctuary needs to determine if these are the best questions and how to address them.

Recommendation: It would be of value for RAP to become educated about marine acoustics through a presentation. Thus prepared, the RAP could review upcoming problems related to acoustics.

Monitoring Water Quality

Sanctuary is beginning to focus more attention on water quality issues.

- Freshwater input
- Seawater quality

Possible Questions

- Do the pulses of high nutrient input and pollutants contribute to long-term chronic health problems for species at the islands?
- Do PCBs increase in marine mammal fatty tissues from western to eastern islands?

Donna Meyers, West Coast Coordinator for Water Quality Programs

- Review of existing programs
- Recommendations for additional monitoring

Donna will be completing a summary report in Spring 2005

Water quality is a possible future focal area for RAP

All Channel Islands are Areas of Special Biological Significance, designated by State Water Quality Board. Point and non-point source discharge has been identified in various ASBS areas.

Action: Obtain information about point and non-point source discharges for the 5 northern islands.

Kira Schmidt (Channel Keeper) does water quality monitoring along mainland coast. Channel Keeper might consider a partnership with Sanctuary for water quality

monitoring. Types of monitoring that could occur at the islands include stream water quality monitoring and effects of small boat traffic.

MMS is going to be phasing out all types of coastal biological monitoring, including State mussel watch program.

Action: Wait for Donna Meyers to come up with list of recommendations and priorities and then work with her to implement them.

How do we communicate the research that is ongoing?

Permits require that scientists provide report and data to Sanctuary.

Scientists do not always return results of studies to CINMS.

CINMS does not have clearinghouse for data so that it can be shared with the public.

There is no good system or follow-up to acquire data.

If CINMS imposes too heavy of a burden, then the researchers may be discouraged from doing science.

Possible tools to facilitate communication

- Currents Symposium (MBNMS) could be a model for sharing of science with the public.
- Channel Islands Marine Research Committee (shares science)
- Bren School developed database for CINMS
- Environmental Media Department on campus may be interested in the communication workshop
- PISCO communication workshop (Summer 2005)

Action: CINMS needs to submit a request to NOAA for ship time on the large NOAA vessels. Sarah Fangman is looking for different research projects for the vessels (E.g. MacArthur II).